To: Daly, Eric[Daly.Eric@epa.gov]
From: Rotola, Joe
Sent: Wed 8/17/2016 12:37:24 AM
Subject: Re: See red text below

Correct.

Sent from my iPhone

On Aug 16, 2016, at 6:04 PM, Daly, Eric <Daly.Eric@epa.gov> wrote:

Thanks Joe. So that was to capture how the three sites were recommended for further removal assessment

From: Rotola, Joe
Sent: Tuesday, August 16, 2016 4:32 PM
To: Daly, Eric <Daly.Eric@epa.gov>
Subject: RE: See red text below

1. **Removal Site Evaluation**

Concepts

Elements within the periodic table are comprised of both unstable and stable forms. Unstable elements are known as known as "radionuclides," and give off radiation in the form of a wave (i.e. gamma radiation) or particle (e.g. alpha radiation or beta radiation) to become more stable. The time in which radionuclides becomes stable can range from seconds to billions of years. Long-lived radionuclides, such as uranium and thorium, have always been present within the Earth's crust for millions of years and within the tissues of all living species. Material that contain radionuclides in natural form is known as Naturally Occurring Radioactive Materials, or commonly referred to as "NORM" and contribute to background radiation levels. Examples of NORM include sands, clays and soils, rocks, coal, groundwater, oil and gas, as well as, metal ores and non-metal minerals.

Many radionuclides within NORM may become concentrated or exposed to the accessible environment as a result of human activities such as manufacturing, mineral extraction, or water processing. This is known as Technically Enhanced Radioactive Material or "TENORM." EPA has described TENORM as any:

"radiological, physical, and chemical properties of the radioactive material have been concentrated or further altered by having been processed, or beneficiated, or disturbed in a way that increases the potential for human and/or environmental exposures."

When companies began extracting precious metal and/or rare earths material from ore, companies had little suspicion that the principal minerals being mined or processed contained TENORM in the waste and/or product of the material being extracted. As a result, radioactive waste at mines and mineral processing/manufacturing facilities were often regarded as non-hazardous material and were disposed improperly. The majority of companies saw opportunities to recycle waste to businesses within their area as fill dirt for projects including road construction and parking lots. The Site is one location where contaminated fill dirt was used to construct the parking lot.

Terminology

To evaluate land and/or buildings potentially contaminated with radioactive materials, a variety of instrumentation must be used. When performing a scoping survey, the extent of contamination (i.e. how far is the contamination on the Site), as well as, the intensity of radiation (i.e. which areas/locations contribute to the greatest risk or dose) must be identified. Hand held and portable equipment such as a sodium iodide detectors, Geiger Mueller counter, proportional detectors, and/or ion chambers maybe used as a field equipment to determine the extent of contamination and/or dose or exposure rates due to gamma radiation. In general, most of these equipment are used qualitatively and compared to background readings to determine the extent and intensity of contamination, in addition to, answering if further investigation is needed. Examples of units used for qualitative measurements at the Site include counts per minute (cpm) for contamination, micro-Roetgen per hour (µR/hr) for exposure rate, or millirem per hour (mrem/hr) for dose rate measurements.

In most cases, the equipment used to collected qualitative measurements may not give an accurate or precise quantity of contamination due to poor efficiencies for specific radionuclides, poor geometries due to the instrumentation setup, and fast counting time. Qualitative measurements should always be paired with quantitative data when characterizing a site contaminated with radioactive materials. Quantitative data can be used to verify or correlate the qualitative instrumentation reading to quantitative soil sampling. This is commonly referred to as "ground truthing." Examples of quantitative measurements are samples, such as air, water, sediment, soil, and/or vegetation samples, taken from areas of known or suspected contamination and analyzed by a laboratory. The units for quantitative measurements are in units of picoCuries per gram (pCi/g). For the Site cleanup, only quantitative measurements are used to give definitive results and to verify cleanup has been completed.

<u>Risk Calculation</u>

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Since removal actions are not a part of the remedial program, removal is not mandated to meet the risk requirements of 10^{-4} to 10^{-6} for site cleanups. However, in recent years, EPA has encouraged removal cleanups to meet, at a minimum, the remedial cleanup values associated with the 10^{-4} carcinogenic risk based on the reasonable maximum exposure for an individual. To determine if contamination levels exceed the cancer risk of 10^{-4} (i.e. 1 in 10,000 of cancer), a risk assessment must be performed. EPA's Preliminary Remediation Goal (PRG) Calculator was created to help calculate risk vs. cleanup levels for various receptors taking into consideration exposures from all potential pathways, and through all media (e.g., soil, ground water, surface water, sediment, air, structures, etc.).

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<u>Site Assessment</u>

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From September to December 2013, the EPA Pre-Remedial Program conducted radiological surveys of the exterior areas of the Site. See Attachment C for the results of the gamma survey. The highest gamma radiation screening results were recorded from the exposed soil area of the rear, northern portion of the 9540 Niagara Falls Boulevard property. In December 2013, EPA also documented areas of observed contamination at the Site by measuring gamma radiation exposure rates and comparing these rates to site-specific background rates. An area of approximately 168,832 square feet (ft^2) was found to have gamma radiation levels that exceeded two times the background measurement.

To further quantify the contamination at the Site, in December 2013, a total of 16 soil samples, including one environmental duplicate sample, and 3 slag samples were collected from 15 boreholes throughout the main footprint of the Site using hollow-stem auger drilling methods. Two soil samples were collected on the adjacent First Assembly Church property to document background conditions. Analytical results indicated concentrations of radionuclides found in the slag and soil to be significantly higher than at background conditions. The maximum concentration of the radionuclides of concern were Radium-226 (Ra-226) at 199 picocuries per gram (pCi/g), and Radium-228 (Ra-228) at 807 pCi/g.

A screening risk assessment was conducted to calculate risk estimates using exposure rate data from the site and evaluating exposure pathways. Based on this screening, it was determined that there was an increased lifetime cancer risk above the acceptable risk range and that a removal action was necessary. Further assessment was warranted to determine the extent of the contamination and the scope of work to address the exposure.

Between July and August 2015, the EPA Region 2 Removal Program conducted further radiological assessment of the interior and exterior of the Site. The goal for this assessment was to determine the extent of contamination at the Site, as well as to determine whether workers at the Site were being exposed to elevated levels of radon/thoron or loose contamination. As reported by the Pre-Remediation Program, the office area and warehouse space located at 9540 Niagara Falls Boulevard showed elevated readings of gamma radiation roughly 25 times higher than background. Specific sections of the 9524 Niagara Falls Boulevard also exhibited elevated gamma radiation levels; the gamma survey readings were as high as 4 times background in the walk-in cooler of the building and 6 times background in the north end rear vestibule. The exterior area of the Site showed the highest elevation of contamination at roughly 30 times background.

From: Daly, Eric
Sent: Tuesday, August 16, 2016 1:33 PM
To: Rotola, Joe <Rotola.Joe@epa.gov>
Subject: RE: Niagara Falls Blvd

Hi Joe. You made comments? I went through quickly and didn't see anything highlighted or marked up. Did you just make revisions and accept them, ready to go?

From: Rotola, Joe
Sent: Tuesday, August 16, 2016 1:28 PM
To: Ekstedt, Christina <Ekstedt.Christina@epa.gov>; Daly, Eric <Daly.Eric@epa.gov>
Cc: Mosher, Eric <Mosher.Eric@epa.gov>; Pane, Mark <Pane.Mark@epa.gov>; Daloia, James <daloia.james@epa.gov>
Subject: Niagara Falls Blvd

Attached is the NFB action memo with my comments. Please check the formatting before preparing the final package.

Thanks